



Links between pollen, atopy and the asthma epidemic

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Abstract:

Pollen allergy has been found in 80-90% of childhood asthmatics and 40-50% of adult-onset asthmatics. Despite the high prevalence of atopy in asthmatics, a causal relationship between the allergic response and asthma has not been clearly established. Pollen grains are too large to penetrate the small airways where asthma occurs. Yet pollen cytoplasmic fragments are respirable and are likely correlated with the asthmatic response in allergic asthmatics. In this review, we outline the mechanism of pollen fragmentation and possible pathophysiology of pollen fragment-induced asthma. Pollen grains rupture within the male flowers and emit cytoplasmic debris when winds or other disturbances disperse the pollen. Peak levels of grass and birch pollen allergens in the atmosphere correlated with the occurrence of moist weather conditions during the flowering period. Thunderstorm asthma epidemics may be triggered by grass pollen rupture in the atmosphere and the entrainment of respirable-sized particles in the outflows of air masses at ground level. Pollen contains nicotinamide adenine dinucleotide phosphate (reduced) oxidases and bioactive lipid mediators which likely contribute to the inflammatory response. Several studies have examined synergistic effects and enhanced immune response from interaction in the atmosphere, or from co-deposition in the airways, of pollen allergens, endogenous pro-inflammatory agents, and the particulate and gaseous fraction of combustion products. Pollen and fungal fragments also contain compounds that can suppress reactive oxidants and quench free radicals. It is important to know more about how these substances interact to potentially enhance, or even ameliorate, allergic asthma. Copyright © 2007 S. Karger AG.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Extreme Weather Event, Precipitation

Air Pollution: Allergens

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

Climate Change and Human Health Literature Portal

resource focuses on specific location

United States

Health Impact: ☒

specification of health effect or disease related to climate change exposure

Respiratory Effect, Other Health Impact

Respiratory Effect: Asthma

Other Health Impact: allergic diseases

Resource Type: ☒

format or standard characteristic of resource

Review

Timescale: ☒

time period studied

Time Scale Unspecified